



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,285	02/08/2001	William H. Gong	37,248	6593
4249	7590	04/15/2004	EXAMINER	
CAROL WILSON BP AMERICA INC. MAIL CODE 5 EAST 4101 WINFIELD ROAD WARRENVILLE, IL 60555			GRIFFIN, WALTER DEAN	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/779,285

Applicant(s)

GONG ET AL.

Examiner

Walter D. Griffin

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12 and 14-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12 and 14-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 28, 2004 has been entered.

### ***Response to Amendment***

The objection to claim 23 as described in the paper mailed on October 28, 2003 has been withdrawn in view of the amendment filed on January 28, 2004.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1764

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 12 and 14-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748) in view of Malisoff (1,972,102), Ford et al. (US 3,341,448), Gore (6,274,785), and either GB 2262942A or Webster et al. (3,163,593).

The Hatanaka reference discloses a process for removing sulfur from a hydrocarbon by hydrotreating the hydrocarbon feed and then separating the hydrotreated feed into a light and heavy fraction. This hydrotreating is conducted in the presence of a hydrotreating catalyst. The resulting hydrotreated feed is separated into a light fraction and a heavy fraction. The cut point temperature for separation of the fractions is in the range of 300 to 350°C. The light fraction is essentially free of sulfur whereas the heavy fraction must be further desulfurized to remove, for example, dibenzothiophene compounds. Following this further desulfurization, the light and heavy fractions are blended to produce a fuel. See col. 2, lines 65-67; col. 3, lines 1-11 and 26-56; col. 4, lines 11-67; col. 5, lines 1-23 and 65-67; and col. 6, lines 1-10.

The Hatanaka reference does not disclose desulfurization of the heavy fraction by oxidation as claimed including treating and recycling the separated immiscible phase and further treating with a sorbent or immiscible liquid. The Hatanaka reference also does not disclose the presence of nitrogen in the hydrocarbon.

Art Unit: 1764

The Malisoff reference discloses a process for removing sulfur compounds from hydrocarbon oils by contacting the oil with a mixture of water, hydrogen peroxide, and organic acid such as acetic acid. Specific hydrocarbons disclosed include naphtha, gasoline, and gas oil. These hydrocarbons would necessarily have an API gravity and boil within the ranges claimed. Example 1 indicates a temperature of 90°F (32°C). After contacting, the mixture and oil separate into layers. The layers are then separated and the oil is recovered. See page 1, lines 6-32 and 49-68.

The Ford reference discloses that the degree of desulfurization achieved by successive oxidative and hydrodesulfurization stages is significantly higher than that achieved by either two successive oxidative desulfurization stages or two successive hydrodesulfurization stages and that the improvement is independent of the order of the stages. See col. 3, lines 13-30.

The Gore reference discloses treating and recycling the oxidant. Gore also discloses treating the organic phase with a solvent such as methanol. Gore also discloses that nitrogen compounds can be removed by the oxidation treatment. See col. 4, line 47 through col. 5, line 6; col. 7, line 45 through col. 8, line 37; col. 9, lines 5-20; col. 11, line 50 through col. 12, line 22; and col. 14, lines 36-39.

The GB reference discloses the treatment of a treated oil with an alumina adsorbent. See page 16, lines 16-18.

The Webster reference discloses that a hydrocarbon that has been subjected to an oxidation treatment can be further treated in the presence of an alkaline material. See column 2, lines 42-53.

Art Unit: 1764

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Hatanaka by substituting the desulfurization process of Malisoff for the second desulfurization of Hatanaka because the desulfurization of Malisoff would be effective for removing sulfur compounds removed by the second desulfurization of Hatanaka. Additionally, as disclosed by Ford, combining the first hydrodesulfurization of Hatanaka with the oxidative desulfurization of Malisoff would result in the expectation that a significantly higher degree of desulfurization would be achieved than is achieved by the two successive hydrodesulfurization stages disclosed by Hatanaka.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have treated and recycled the oxidation phase as suggested by Gore because recycling will improve the economics of the process. Since Malisoff discloses the use of concentrated water solutions, one would adjust the water concentration in the recycled oxidation phase to produce an oxidation phase that is effective for oxidation.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized a solvent such as methanol in the process of Malisoff as suggested by Gore because a purified organic phase will be obtained.

Regarding the presence of nitrogen compounds in the feed, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a feed that contains nitrogen compounds because the presence of nitrogen compounds would not affect the removal of sulfur compounds and because the nitrogen compounds will also be removed.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to treat the oil with a sorbent such as alumina as suggested by the GB reference because an oil with a lowered sulfur content will be obtained.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to treat the oil with an alkaline material as suggested by Webster because a material with a reduced amount of sulfur will be obtained. It appears as if any alkaline material including those claimed would work equivalently in the process.

### *Response to Arguments*

The argument that the Malisoff reference does not disclose the treatment of the petroleum with an immiscible phase is not persuasive. The Malisoff reference discloses in page 1, lines 17-22, that the treating solution may be prepared with a quantity of organic acid preferably sufficient to impart at least partial oil solubility in the treating solution. The use of the word “preferably” indicates that the treating solution need not have at least partial oil solubility. Therefore, the examiner maintains that the Malisoff reference discloses the use of an immiscible solution.

The argument that the claimed process produces sulfur concentrations in the treated product that are far lower than those in the product of Malisoff is not persuasive. This is not unexpected because the claimed process includes multiple sulfur removal steps whereas the Malisoff process comprises only the contacting with the treating solution. Additionally, the Ford reference indicates that the combination of hydrotreating and oxidation would produce a higher degree of desulfurization.

The argument that substituting the oxidation step of Malisoff for the second HDS of Hatanaka does not produce an equivalent result is not persuasive. Both the oxidation and HDS steps result in the removal of sulfur. Therefore, the examiner maintains that one having ordinary skill in the art would expect similar results from either the HDS or oxidation steps.

The argument that the Gore reference does not disclose the removal of water from the recycled oxidant is not persuasive. Gore teaches that used oxidant is pumped into an oxidant recycler where it is treated and oxidized back up to reactive form and recycled. This indicates that the recycled oxidant is treated so that it is essentially the same as the original oxidant.

The argument concerning the GB reference is not persuasive because although it might disclose additional steps, the claims do not exclude additional steps.

The argument concerning the Webster reference is not persuasive because other advantages result from the use of lime.

The Affidavit filed on December 29, 2003 has been considered but is insufficient to overcome the rejection of the claims. The new rejection detailed above includes a teaching in the Ford reference that discloses the advantage resulting from combining hydrotreating and oxidation. The examiner asserts that this disclosed advantage would provide the motivation to combine the hydrotreating of Hatanaka with the oxidation of Malisoff.

Additionally, the affidavit argues that the water concentration used in the oxidation phase provides an unexpected benefit. However, this limitation is not claimed.

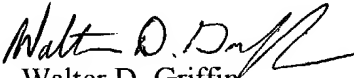


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is (571) 272-1447. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Walter D. Griffin  
Primary Examiner  
Art Unit 1764

WG  
April 12, 2004